Abstract Submitted
for the 4CF13 Meeting of
The American Physical Society

Nano-imaging of graphene plasmons JUSTIN GERBER, BRIAN O'CALLAHAN, SAMUEL BERWEGER, MARKUS RASCHKE, University of Colorado at Boulder — Graphene plasmonics provides strong and wavelength-tunable spatial confinement of electromagnetic fields at mid-infrared frequencies. Near-field imaging of standing wave surface plasmon polariton (SPP) spatial distributions has been recently achieved by scattering-type scanning near-field optical microscopy (*s*-SNOM). The spatial patterns are a result of the interference of plasmons launched by the sharp scanning probe tip with counter-propagating plasmons reflected from graphene edges. We present a full phase and amplitude resolved near-field characterization of SPP propagation and reflection off edges, defects, and grain boundaries. Using mid-infrared excitation at $\lambda_{\mathrm{exc}} = 10.8\mu$m, we measure deep sub-wavelength periodicity in the spatial distribution of the near-field with plasmon wavelength on the order of $\lambda_{\mathrm{p}} = 250$ nm. The standing amplitude and phase patterns can be fully described based on a simple near-field SPP cavity model.

Brian O'Callahan
University of Colorado at Boulder

Date submitted: 23 Sep 2013 Electronic form version 1.4